The Symbiotic Relationship of the Hubble and the Space Shuttle

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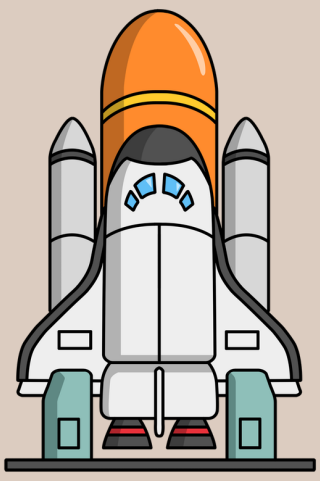

The Hubble Space Telescope would not exist without the Space Shuttle. A household name and a key contributor to the wealth of scientific data, the Hubble Space Telescope was reliant on the Space Shuttle, from its inception to its working years.

According to NASA, the Space Shuttle could carry a maximum of 65,000 pounds (Galvez et al., p. 59). This carry weight, along with its large payload capacity, made it an ideal candidate for transporting the floating observatory. This led NASA engineers to "[create] the telescope to fit snugly inside the shuttle's cargo bay" (*The Hubble Story*, 2021). After designing and building the Hubble telescope over the course of 10 years, the Space Shuttle was flown to its new home, 340 miles above the Earth's surface (*Observatory*, 2019). The first pictures were eagerly awaited by the media and engineers alike. What were supposed to be crisp images of the stars and galaxies surrounding were blurry images, useless to the scientific community. This was due to a defect in its imaging system which was off by, according to NASA, "just a fraction of the width of a human hair" (*The Hubble Story* ', 2021). This would most certainly have doomed the telescope if it were not due to the Space Shuttle's ability to conduct repair missions.

Commanded by Colonel Richard "Dick" Covey, STS-61 was the first Hubble Space Telescope servicing mission (*STS-61*, 2010). This mission utilized the Shuttle's mechanical arm to grab the orbiting observatory before a total of five space walks were conducted to fix the stricken observatory. Colonel Covey, and his crew were not short of challenges during STS-61. Towards the conclusion of EVA #1, the crew "had difficulty closing compartment doors" and resorted to hammering the doors shut, a crude yet successful approach(*STS-61*, 2010). While at times the crew had to resort to brute force, the Space Shuttle was a highly sophisticated toolbox. Without the numerous tools at the disposal of the Space Shuttle, the decade-and-a half span of Hubble repairs most certainly would not have been possible. These unique aspects of The Shuttle are vast and are not limited to, the mechanical arm and extended stay crew quarters. The mechanical arm, as pictured in Figure 2, allowed for easy manipulation of large objects in space and allowed for the capture of Hubble while orbiting earth. The Shuttle also provided a home away from home for the crew onboard, with eating and sleeping accommodations. The longest stay, according to NASA, being seventeen days (*FAI*, 2016). These allowed for a crew of astronauts to spend multiple days repairing the observatory, an aspect not allowed for by any other spacecraft at the time.

Figure 2. Mechanical arm of the Space Shuttle being used to repair Hubble on STS-61.

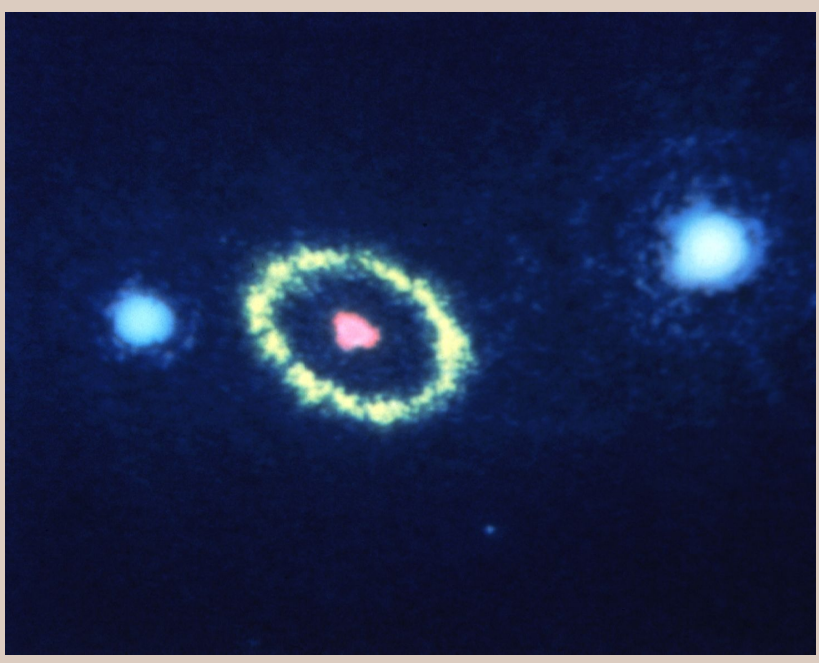

Figure 1. First images from the Hubble Space Telescope

The one of a kind nature of the Space Shuttle allowed for the existence of Hubble. Thanks to the help of the Space Shuttle, "[Hubble] has taken over a million observations and provided data that astronomers have used to write more than 18,000 peer-reviewed scientific publications" (*Highlights of Hubble's Exploration of the Universe*, 2021). In the same article, NASA detailed that more than 150 new references to Hubble data are being made every day. Unfortunately, since the retirement of the Space Shuttle, Hubble is no longer being serviced. However, even without continuous service, Hubble is expected to lend a hand to scientists well into the 2020s.

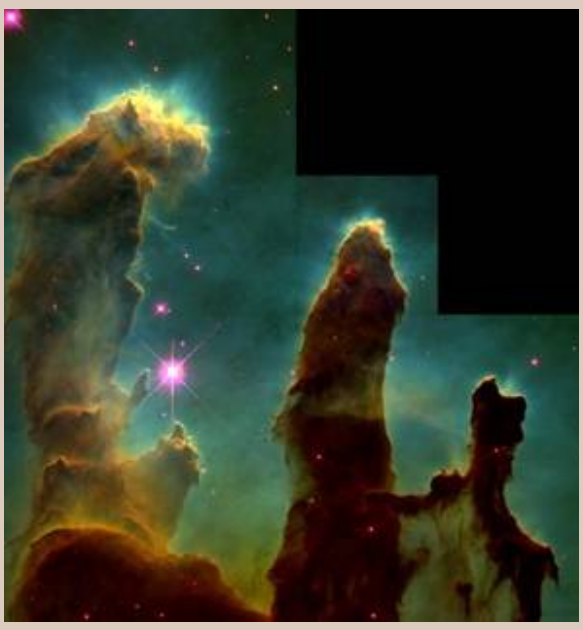

Figure 3. One of the most majestic pictures taken by Hubble, "Pillars of Creation"

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Hubble Blurry Image. photograph. https://www.nasa.gov/sites/default/files/thumbnails/image/full_jpg.jpg.